

# EVLYS LTD. - POWER SEMICONDUCTORS DEVICES - Wholesale and Retail.

## Phase Control Disc Thyristor Type DT24-500-8

High power cycling capability / Low on-state and switching losses  
Designed for traction and industrial applications

Mean on-state current	$I_{TAV}$		500 A					
Repetitive peak off-state voltage	$V_{DRM}$		100 ÷ 800 V					
Repetitive peak reverse voltage	$V_{RRM}$							
Turn-off time	$t_q$		80 $\mu$ s					
$V_{DRM}, V_{RRM}, V$	100	200	300	400	500	600	700	800
Voltage code	1	2	3	4	5	6	7	8
$T_j, ^\circ C$	-60 ÷ 150							

### MAXIMUM ALLOWABLE RATINGS

Symbols and parameters		Units	Values	Test conditions	
<b>ON-STATE</b>					
$I_{TAV}$	Mean on-state current	A	500 605	$T_c=100^\circ C$ , Double side cooled $T_c=85^\circ C$ , Double side cooled 180° half-sine wave; 50 Hz	
$I_{TRMS}$	RMS on-state current	A	785	$T_c=100^\circ C$ , Double side cooled 180° half-sine wave; 50 Hz	
$I_{TSM}$	Surge on-state current	kA	6.0 6.9	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; 50 Hz ( $t_p=10$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50 \mu s$ ; $di_G/dt \geq 1$ A/ $\mu s$
			7.0 8.1	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; 60 Hz ( $t_p=8.3$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50 \mu s$ ; $di_G/dt \geq 1$ A/ $\mu s$
$I^2t$	Safety factor	$A^2s \cdot 10^3$	180 235	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; 50 Hz ( $t_p=10$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50 \mu s$ ; $di_G/dt \geq 1$ A/ $\mu s$
			200 270	$T_j=T_{jmax}$ $T_j=25^\circ C$	180° half-sine wave; 60 Hz ( $t_p=8.3$ ms); single pulse; $V_D=V_R=0$ V; Gate pulse: $I_G=2$ A; $t_{GP}=50 \mu s$ ; $di_G/dt \geq 1$ A/ $\mu s$
<b>BLOCKING</b>					
$V_{DRM}, V_{RRM}$	Repetitive peak off-state and Repetitive peak reverse voltages	V	100 ÷ 800	$T_{jmin} < T_j < T_{jmax}$ ; 180° half-sine wave; 50 Hz; Gate open	
$V_{DSM}, V_{RSM}$	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	200 ÷ 900	$T_{jmin} < T_j < T_{jmax}$ ; 180° half-sine wave; 50 Hz; single pulse; Gate open	
$V_D, V_R$	Direct off-state and Direct reverse voltages	V	$0.75 \cdot V_{DRM}$ $0.75 \cdot V_{RRM}$	$T_j=T_{jmax}$ ; Gate open	

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<b>TRIGGERING</b>				
$I_{FGM}$	Peak forward gate current	A	5	$T_j = T_{j\max}$
$V_{RGM}$	Peak reverse gate voltage	V	5	
$P_G$	Gate power dissipation	W	3	$T_j = T_{j\max}$ for DC gate current
<b>SWITCHING</b>				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive (f=1 Hz)	A/ $\mu$ s	250	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; $I_{TM} = 2 I_{TAV}$ ; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ $\mu$ s
<b>THERMAL</b>				
$T_{stg}$	Storage temperature	$^{\circ}$ C	-60÷150	
$T_j$	Operating junction temperature	$^{\circ}$ C	-60÷150	
<b>MECHANICAL</b>				
F	Mounting force	kN	5.0÷7.0	
a	Acceleration	m/s <sup>2</sup>	50 100	Device unclamped Device clamped

## CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
<b>ON-STATE</b>					
$V_{TM}$	Peak on-state voltage, max	V	1.55	$T_j = 25 \text{ }^{\circ}\text{C}$ ; $I_{TM} = 1570$ A	
$V_{T(TO)}$	On-state threshold voltage, max	V	0.80	$T_j = T_{j\max}$ ;	
$r_T$	On-state slope resistance, max	m $\Omega$	0.490	$0.5 \pi I_{TAV} < I_T < 1.5 \pi I_{TAV}$	
$I_L$	Latching current, max	mA	500	$T_j = 25 \text{ }^{\circ}\text{C}$ ; $V_D = 12$ V; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ $\mu$ s	
$I_H$	Holding current, max	mA	250	$T_j = 25 \text{ }^{\circ}\text{C}$ ; $V_D = 12$ V; Gate open	
<b>BLOCKING</b>					
$I_{DRM}, I_{RRM}$	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	50	$T_j = T_{j\max}$ ; $V_D = V_{DRM}$ ; $V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage <sup>1)</sup> , min	V/ $\mu$ s	1000	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; Gate open	
<b>TRIGGERING</b>					
$V_{GT}$	Gate trigger direct voltage, max	V	4.00	$T_j = T_{j\min}$	Direct gate current $V_D = 12$ V; $I_D = 3$ A;
			2.50	$T_j = 25 \text{ }^{\circ}\text{C}$	
			2.00	$T_j = T_{j\max}$	
$I_{GT}$	Gate trigger direct current, max	mA	400	$T_j = T_{j\min}$	
			250	$T_j = 25 \text{ }^{\circ}\text{C}$	
			200	$T_j = T_{j\max}$	
$V_{GD}$	Gate non-trigger direct voltage, min	V	0.25	$T_j = T_{j\max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ;	
$I_{GD}$	Gate non-trigger direct current, min	mA	10.00	Direct gate current	
<b>SWITCHING</b>					
$t_{gd}$	Delay time	$\mu$ s	1.60	$T_j = 25 \text{ }^{\circ}\text{C}$ ; $V_D = 0.4 \cdot V_{DRM}$ ; $I_{TM} = I_{TAV}$ ; Gate pulse: $I_G = 2$ A; $t_{GP} = 50 \mu$ s; $di_G/dt \geq 1$ A/ $\mu$ s	
$t_q$	Turn-off time <sup>2)</sup> , max	$\mu$ s	80	$dv_D/dt = 50$ V/ $\mu$ s; $T_j = T_{j\max}$ ; $I_{TM} = I_{TAV}$ ; $di_R/dt = -10$ A/ $\mu$ s; $V_R = 100$ V; $V_D = 0.67 \cdot V_{DRM}$	

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<b>THERMAL</b>					
$R_{thjc}$	Thermal resistance, junction to case, max	°C/W	0.070	Direct current	Double side cooled
$R_{thjc-A}$			0.154		Anode side cooled
$R_{thjc-K}$			0.126		Cathode side cooled
$R_{thck}$	Thermal resistance, case to heatsink, max	°C/W	0.010	Direct current	
<b>MECHANICAL</b>					
w	Weight, typ	g	70		
$D_s$	Surface creepage distance	mm (inch)	7.94 (0.313)		
$D_a$	Air strike distance	mm (inch)	5.00 (0.197)		

## **PART NUMBERING GUIDE**

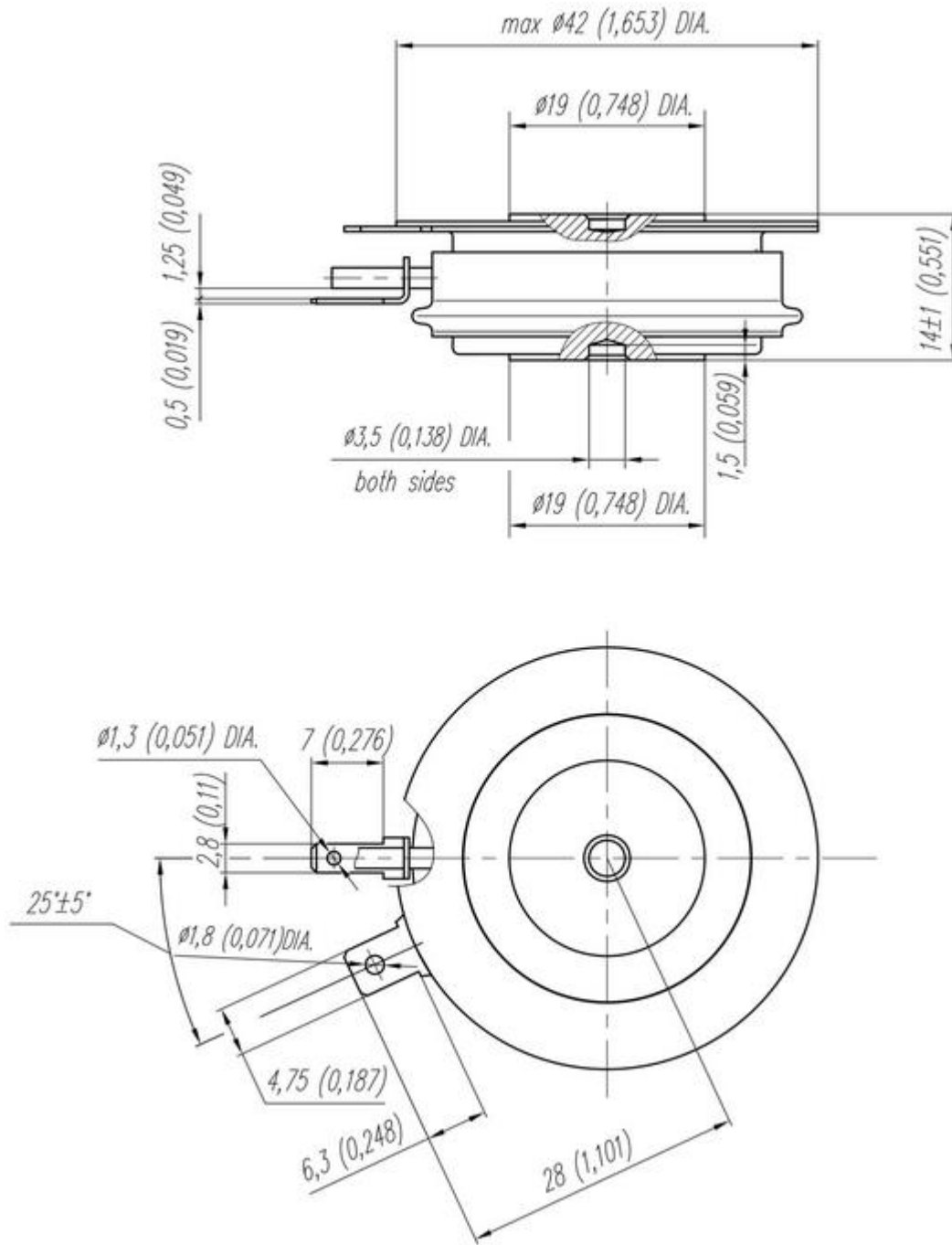
DT	24	500	8
1	2	3	4

1. DT - Phase Control Disc Thyristor
2. Element Diameter
3. Mean on-state current, A
4. Voltage code

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## OVERALL DIMENSIONS

Package type: **T.A1**



All dimensions in millimeters (inches)